

Sampling

1. Define the following terms
 - a. Census
 - b. Bias
 - c. Selection Bias
 - d. Measurement or Response Bias
 - e. Nonresponse Bias
 - f. Simple Random Sample
 - g. Sampling Frame
 - h. Sampling with replacement
 - i. Sampling without replacement
 - j. Stratified Sampling
 - k. Strata
 - l. Cluster Sampling
 - m. Clusters
 - n. Systematic Sampling
 - o. Voluntary Response Sampling
2. A petition with 500 signatures is submitted to a university's student council. The council president would like to determine the proportion of those who signed the petition who are actually registered students at the university. There is not enough time to check all 500 names with the registrar, so the council president decides to select a simple random sample of 30 signatures. Describe how this might be done.
3. The financial aid advisor of a university plans to use a stratified random sample to estimate the average amount of money that students spend on textbooks each term. For each of the following proposed stratification schemes, discuss whether it would be worthwhile to stratify the university students in this manner.
 - a. Strata corresponding to class standing (freshman, sophomore, junior, senior, graduate student)
 - b. Strata corresponding to field of study, using the following categories: engineering, architecture, business, other.
 - c. Strata corresponding to the first letter of the last name: A-E, F-K, etc.
4. For each of the situations described, state whether the sampling procedure is simple random sampling, stratified random sampling, cluster sampling, systematic sampling, or convenience sampling.
 - a. All first-year students at a university are enrolled in 1 of 30 sections of a seminar course. To select a sample of freshmen at this university, a researcher selects four sections of the seminar course at random from the 30 sections and all students in the four selected sections are included in the sample.
 - b. To obtain a sample of students, faculty, and staff at a university, a researcher randomly selects 50 faculty members from a list of faculty, 100 students from a list of students, and 30 staff members from a list of staff.

- c. A university researcher obtains a sample of students at his university by using the 85 students enrolled in his Psychology 101 class.
 - d. To obtain a sample of the seniors at a particular high school, a researcher writes the name of each senior on a slip of paper, places the slips in a box and mixes them, and then selects 10 slips. The students whose names are on the selected slips of paper are included in the sample.
 - e. To obtain a sample of those attending a basketball game, a researcher selects the 24th person through the door. Then, every 50th person after that is also included in the sample.
5. Of the 6500 students enrolled at a community college, 3000 are part time and the other 3500 are full time. The college can provide a list of students that is sorted so that all full-time students are listed first, followed by the part-time students.
- a. Describe a procedure for selecting a stratified random sample that uses full-time and part-time students as the two strata and that includes 10 students from each stratum.
 - b. Does every student at this community college have the same chance of being selected for inclusion in the sample? Explain.